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[Continued on next page]

(54) Title: METHOD FOR CHOOSING A REFERENCE INFORMATION ITEM IN A TELEVISION SIGNAL
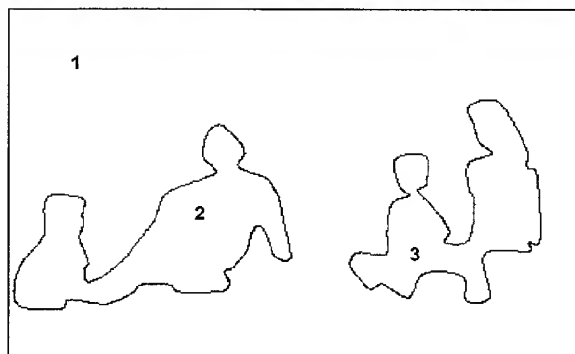
(57) Abstract: A description is given of a method for choosing a reference information item in a television signal, which can be employed in particular for calling up an Internet and/or email address with a television set. A television signal comprises a video signal and a supplementary signal, the reference information item being contained in the supplementary signal. According to the invention, the reference information item is assigned to a sub-area of the picture content of the video signal, the reference information item being chosen by selecting the assigned sub-area and a reproduction of assigned information being enabled. The supplementary signal contains contour information items which are assigned to the sub-area of the picture content and represent an approximation of the outer contour of the sub-area. The supplementary signal is preferably situated in the vertical blanking interval in the case of an analogue television signal and in the so-called user data in the case of a digital television signal.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Method for choosing a reference information item in a television signal

The invention relates to a method for choosing a reference information item in a television signal, which can be employed in particular for calling up an Internet and/or email address with a television set.

Prior art

An essential constituent in the configuration of Internet pages is the use of references, so-called hyperlinks or links for short. These hyperlinks specify a unique address of a document or a file in the form Internet service://Computername/Directoryname/Name.Type#Location in the object.

The graphical representation of the hyperlinks on the screen is often effected as underlined text or by means of pictures linked to the hyperlinks, such pictures being known as icons. A hyperlink is then usually selected and chosen by clicking on the text or the icon with the aid of a computer mouse. As a result of the clicking, by way of example, another Internet page is then called up and loaded into the browser.

Increasingly, Internet or email addresses are also being indicated in television transmissions and on teletext pages. Furthermore, interactive TV sets, also known as web-TV, enable access to the Internet including the reception and the sending of emails, adaptations being necessary owing to the technical differences between current TV sets and PCs.

Thus, WO-A-9749044 discloses an interface for a web browser in order to be able to display Internet pages on a TV screen. In this case, links on Internet pages are recognized by the interface and identified by an assigned

recognition character on the screen. For this purpose, it is possible to use different colours or numbers which enable a link to be chosen without clicking on the link. In this way, it is possible to dispense with the use of a computer mouse and effect a link for example using the TV remote control. This has the advantage that a single control unit can be used to perform both surfing and control of the device, the said control unit furthermore being known to persons who are not used to using a computer mouse, such as older persons, for instance.

DE-A-198 11 103 discloses finding an Internet or email address which is transmitted in the teletext data stream and forwarding this information directly to an Internet browser without having to write the address down and enter it into the Internet browser. The starting point in this case is not an Internet page with embedded links but an operating mode of a television receiver in which teletext data are displayed. In this case, links such as, for instance, HTML links for Internet pages are not embedded in these teletext pages. Rather, the alphanumeric characters which are displayed on the teletext page are analyzed either by the user or a suitable apparatus to determine whether they correspond to an Internet or email address. In particular, the addresses can also be generated by fragments which are displayed on the teletext page.

Furthermore, US-A-5818935 discloses transmitting a table with so-called Internet information pointers together with the video signal. This table can be called up by the user and is then displayed in a manner superposed on the video signal. The user can select one of the addresses displayed, which address is thereupon fed to the Internet browser. In this case, a suitable encoder inserts the Internet information pointers into a specific teletext page at the transmitter end for transmission. If the user wishes to call up an Internet page with information items

with respect to the video signal considered, he must first press a button on the remote control in order that the selection table is displayed, in order then, according to the superposed representation, to select an address, for example by inputting an assigned number.

Invention

The invention is based on the object of specifying a method for choosing a reference information item in a television signal which enables, in a compatible manner, a simple and intuitive control without disturbing insertions. This object is achieved by means of the method specified in Claim 1.

In principle, the method according to the invention consists in the fact that in a television signal which comprises, in addition to the video signal, a supplementary signal for the reference information item, the reference information item is assigned to a sub-area of the picture content of the video signal and the reference information item is chosen by selecting the assigned sub-area, thereby enabling a reproduction of assigned information.

Further advantageous refinements of the invention emerge from the claims, the rest of the description and the drawings, which show exemplary embodiments of the invention.

Drawings

Exemplary embodiments of the invention are described with reference to the drawings, in which:

Figure 1   shows   the   assignment   of   hyperlinks   for
            different sub-areas of a television signal;

Figure 2   shows   an   encoder   with   insertion   of   contour
            information items into the user_data of an MPEG
            signal;

5   Figure 3   shows   an   encoder   with   insertion   of   contour
            information items into the blanking interval of
            an analogue television signal;

Figure 4   shows   a   decoder   with   evaluation   of   contour
10   information items in the user_data of an MPEG
            signal;

Figure 5   shows   a   decoder   with   evaluation   of   contour
            information items in the blanking interval of
15   an analogue television signal.

Exemplary embodiments

Figure 1 elucidates the assignment of hyperlinks for
20 different sub-areas of a television signal. Figure 1a
uses an example to show the picture content of a
television signal, the reproduction being able to be
effected in any desired manner, for instance on a screen.
The reproduced screen shows a family taking a picnic on
25 the beach. In this case, the screen representation has no
disturbing visually perceptible hyperlinks whatsoever in
the form of underlined text or icons.

Nevertheless, a first hyperlink is assigned to the
30 persons and a second hyperlink is assigned to the
background. In this case, as illustrated in Figure 1b,
the contours of the persons serve as delimiting criterion
between the hyperlinks assigned to the different sub-
areas of the picture signal. In this case, the first
35 hyperlink is called up if a sub-area is selected which
lies in the contours 2, 3 of the persons and, by way of
example, can lead the user to the home page of a clothing
department store. By contrast, if the background 1 is

selected, the second hyperlink is called up, which leads for example to the home page of a travel agency. Equally, more detailed information can be directly output for the selected area, in the abovementioned example for instance

5   concerning the holiday region, the price of the articles of clothing represented, or the film names of the persons or the names of the actors playing them. The information can be requested from the Internet in response to the selection by the user or, alternatively, can

10 concomitantly be transmitted from the outset with the video signal.

These more detailed items of information can be reproduced in particular visually on the screen, whether

15 in a manner filling the screen or else in the form of an insertion or superposition. Equally, however, primarily in the case of shorter items of information, it is also possible to effect acoustic reproduction with the aid of a voice synthesiser.

20

Equally, when a sub-area is selected, an email editor can be opened, the recipient address being made available automatically.

25 Finally, it is also possible, instead of a reproduction of further items of information, merely to transmit the selection of an object by the user to the broadcasting corporation. This allows the user, by way of example, to take part in a convenient manner in a viewers poll, known

30 in particular as a TED poll in Germany.

The delimitation of the sub-areas and thus the assignment of the two different hyperlinks in Figure 1 to the persons, on the one hand, and the background, on the

35 other hand, is effected by the contours of the persons being transmitted together with the hyperlinks and the television signal. The hyperlink assigned to the persons can then be selected for example by clicking on a person.

The simplest procedure, but one which is also almost always the least accurate, is to approximate the sub-areas by means of a circle, an ellipse or a polygon. This has the advantage that only very few parameters are required and have to be transmitted - for instance, in the case of a circle, only the centre of the circle and the diameter or radius. The accuracy is sufficient in many cases, since the user will generally tend to click approximately centrally on the object which is to be clicked on.

The contours of the objects to be selected can be approximated more accurately in the majority of cases if the contour is subdivided into a plurality of sub-sections which are approximated separately. Various functions for approximation, such as polynomials and spline functions, are known for this from mathematics. In this case, the quality of the approximation depends on the complexity implemented.

A linear fit, also referred to as "linear regression" or "1st-degree polynomial regression", can be chosen as the simplest approximation function. In this case, an attempt is made to plot a straight line as optimally as possible through a plurality of points. The accuracy can be improved by means of higher-degree polynomial regressions. However, many more complex contours can no longer be suitably described using polynomials. In this case, non-linear fits are used, such as the spline approximation for example.

Equally, it is possible to select a suitable approximation depending on the contour of the sub-area - by way of example, by approximating a plurality of sub-sections of the contour by means of approximation functions for a motor vehicle, and in contrast by means of a circle for a tyre.

Finally, instead of an approximation of the contour, the screen contents can also be divided in a raster-type manner into blocks, an information item regarding the

5   blocks in which an object to be selected is represented being transmitted. In the case of digital video signals in which, as in the case of MPEG II video signals, for the coding, the video signal has been subdivided into macroblocks and blocks, an object to be selected can, in

10   particular, also be assigned thereto.

Figure 2 shows an encoder for inserting contour information items into a digital television signal.

15   By way of example, the MPEG II video standard, as specified in ISO/IEC13818-2, can be used for the transmission or recording and reproduction of digital television signals. The specification provides data areas which can be utilized for specific applications by the

20   user in different layers of the total of six layers, which are designated as sequence layer, GOP (Group Of Pictures) layer, picture layer, slice layer, macroblock layer and block layer. According to the invention, these so-called user_data can be used for the transmission of

25   contour information items and the associated hyperlinks.

For the objects provided with a hyperlink in a frame, contour information items are stored in a memory 4. The contour information items are fed to a converter 5, which

30   uses them to perform an approximation with the aid of Bezier or B splines. The maximum number of control points for the respective splines is in this case limited by a limiting unit 8 depending on various parameters such as the number of objects provided with hyperlinks or the

35   size of the data areas available through the user_data. The data to be transmitted can be reduced by a compression unit 7, which determines a change in the control points, for example as a result of a movement of

the object, and encodes only the resultant difference
values. A synchronization unit 6 in this case ensures
synchronization of the encoding process, for example
encoding based only on the so-called I frames. A further
5   encoder unit 9 then matches the compressed spline data to
the format of the user_data of the MPEG video signal. The
spline data are then inserted together with the address
information items of the respective hyperlinks and, if
appropriate, further data into the user_data, preferably
10   into the extensions_and_user_data of the picture layer,
by a further unit 10.

The spline data can in this case be identified as such,
so that use by correspondingly equipped receiving and/or
15   reproduction devices can be effected and, on the other
hand, the spline data are disregarded in the case of a
conventional receiving and/or reproduction device,
backward compatibility thereby being ensured.

20   Finally, the user_data of the picture layer are then
added to the MPEG video signal for transmission or
recording by means of a multiplexing unit 14, the said
signal, after conversion from an analogue into a digital
television signal by an A/D converter 11 and subsequent
25   buffer-storage in a video memory 12, having been coded by
an MPEG video encoder 13.

Figure 3 shows an encoder for inserting contour
information items into the blanking interval of an
30   analogue television signal.

In analogue television systems such as PAL, NTSC or
SECAM, no video signals are transmitted in the so-called
vertical blanking interval, also called VBI for short.
35   However, this region is utilized for the simultaneous
transmission of digital data. Thus, the so-called VPS
data are transmitted in the VBI in order to simplify
control of the recording mode of a video recorder.

Equally, so-called WSS bits are communicated, which contain an information item regarding the format of the video signal represented. Furthermore, what is known as teletext is utilized in order, in addition to the television programme offered, to reproduce current news, weather reports, sports information, etc. by means of characters and graphics on the screen.

According to the invention, the VBI, in particular in the region of the teletext signal, that is to say, in Germany, lines 11 to 15, 20, 21 in the first field and lines 323 to 328, 333 and 334 in the second field, can be utilized in order to enable transmission of contour information items and the associated hyperlinks. An encoder suitable for this largely corresponds to the encoder from Figure 2 and is illustrated in Figure 3. The units 4, 5, 7 and 8 are identical, synchronization unit 6a now ensures encoding based on every n-th field or frame, encoder unit 9a now matches the compressed spline data to the teletext format and unit 10a now inserts them into the teletext data. The unit 15 supplies an analogue television signal which already contains teletext data or other VBI data. Video signal and data are then separated from one another in a further unit 16. The content of the VBI lines is then fed to the unit 10a for insertion of the contour information items and the video signal is buffer-stored in a memory 17. The completed teletext signal and the buffer-stored video signal are then combined again to form a complete television signal for transmission or recording by means of a multiplexing unit 14a.

The units in Figures 2 and 3 may be partly or completely combined or implemented using software.

At the reproduction end, corresponding decoders can be used in order to separate the video signal again from the contour information items and address information items.

Figure 4 shows a decoder for evaluating contour information items in a digital television signal. Firstly, MPEG signals that are received or are reproduced
5   by a reproduction device are fed to a demultiplexer 15, which separates the user_data of the picture layer from the MPEG-encoded video signal. The video data are then decoded in an MPEG video decoder 16 and buffer-stored in a video buffer 17. In a conversion unit 18, the
10   compressed spline signals are regenerated from the user_data and fed to a decoder unit 19, which determines from the compressed spline signals the support points for the representation of the hyperlink contours. From these, a conversion unit 20 determines the actual contours on
15   the basis of Bezier or B splines. The different contour information items for the hyperlinks concealed in a field or frame are then buffer-stored in the buffer unit 21 and are then superposed preferably invisibly with the video signal by the superposition unit 22.
20
Figure 5 shows a decoder for evaluating contour information items which have been transmitted in the blanking interval of an analogue television signal. As at the encoder end, the decoders also largely correspond, in
25   particular the units 19 to 22 are identical. The unit 23 supplies the analogue television signal with teletext data or other VBI data which contain the contour and address information items. Video signal and data are then separated from one another in the unit 24. The video
30   signal is then buffer-stored in the buffer memory 25, while the content of the VBI lines is fed to the unit 26 for detection and separation of the contour information items.

35   A hyperlink can be chosen in particular by the detection of a cursor position and also of a selection command which can be given in particular by pressing a button. The cursor can be moved over the screen for example by

means of arrow keys on a remote control or a computer mouse.

The ease of operation can be increased further in various ways. Thus, the contours of an object which is provided with a concealed hyperlink can be emphasised in colour when the cursor is guided over the object. Equally, by means of corresponding inputting by the user, the video signal with the current hyperlink can be buffer-stored. This is of interest particularly in the case of rapidly changeable screen contents, since it enables the user to make a selection and choose a hyperlink unhurriedly.

The invention can be implemented in a wide variety of devices appertaining to consumer electronics, such as e.g. TV sets, set-top boxes, video recorders, DVD players, satellite receivers, TV-video combinations.

Patent Claims

1. Method for choosing a reference information item in a television signal comprising a video signal and a supplementary signal, the reference information item being contained in the supplementary signal and the choice of the reference information item enabling a reproduction of assigned information and/or execution of assigned actions, **characterized** in that the reference information item is assigned to a sub-area of the picture content of the video signal and the reference information item is chosen by selecting the assigned sub-area.

2. Method according to Claim 1, **characterized** in that the supplementary signal contains contour information items which are assigned to the sub-area of the picture content and represent an approximation of the outer contour of the sub-area.

3. Method according to Claim 2, **characterized** in that the contour information items contain parameters for approximation functions such as polynomials or spline functions.

4. Method according to one of Claims 1 to 3, **characterized** in that the video signals and supplementary signals have been transmitted as an analogue television signal or reproduced from a recording medium, the supplementary signals having been inserted into the vertical blanking interval of the television signal.

5. Method according to Claim 4, **characterized** in that the supplementary signals are present in a teletext format.

6. Method according to one of Claims 1 to 3, **characterized** in that the video signals and supplementary signals have been transmitted as a digital television signal in accordance with an MPEG video standard or

reproduced from a recording medium, the supplementary signals having been inserted into the user_data of the extensions_and_user_data of the picture layer.

5   7. Method according to one of the preceding claims, **characterized** in that the reference information item represents a hyperlink to an Internet or email address, which hyperlink is forwarded to an Internet browser in the event of the reference information item being chosen.

10

8. Method according to one of the preceding claims, **characterized** in that the reference information item is chosen by selecting an area of the picture content of the video signal using a cursor which is moved over the

15 screen for example using a computer mouse.

9. Apparatus for carrying out the method according to one of the preceding claims.

20 10. Television signal which contains, in addition to the video signal, supplementary signals with reference information items, the choice of the reference information item enabling a reproduction of assigned information, **characterized** in that the reference

25 information item is assigned to a sub-area of the picture content of the video signal.

11. Recording medium for a television signal according to Claim 10.
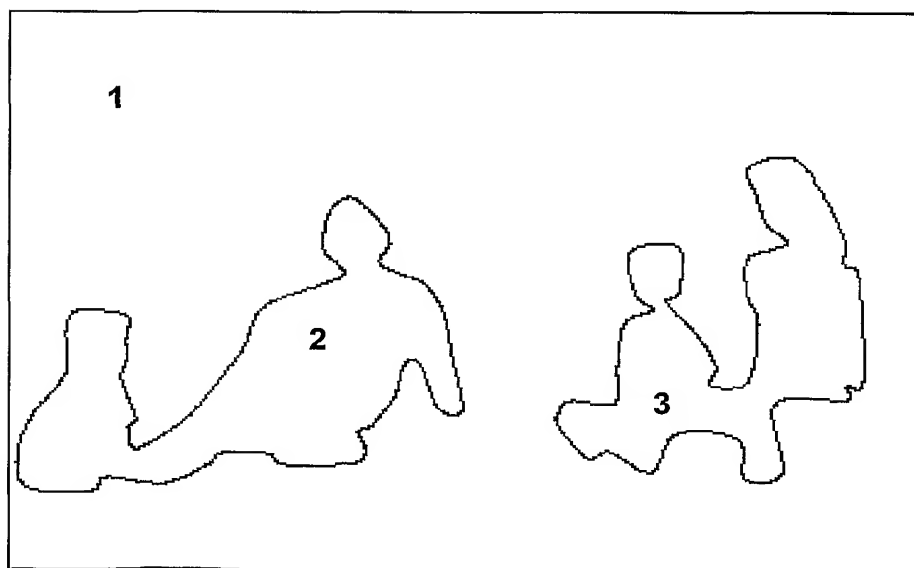
30

Fig. 1a

Fig. 1b
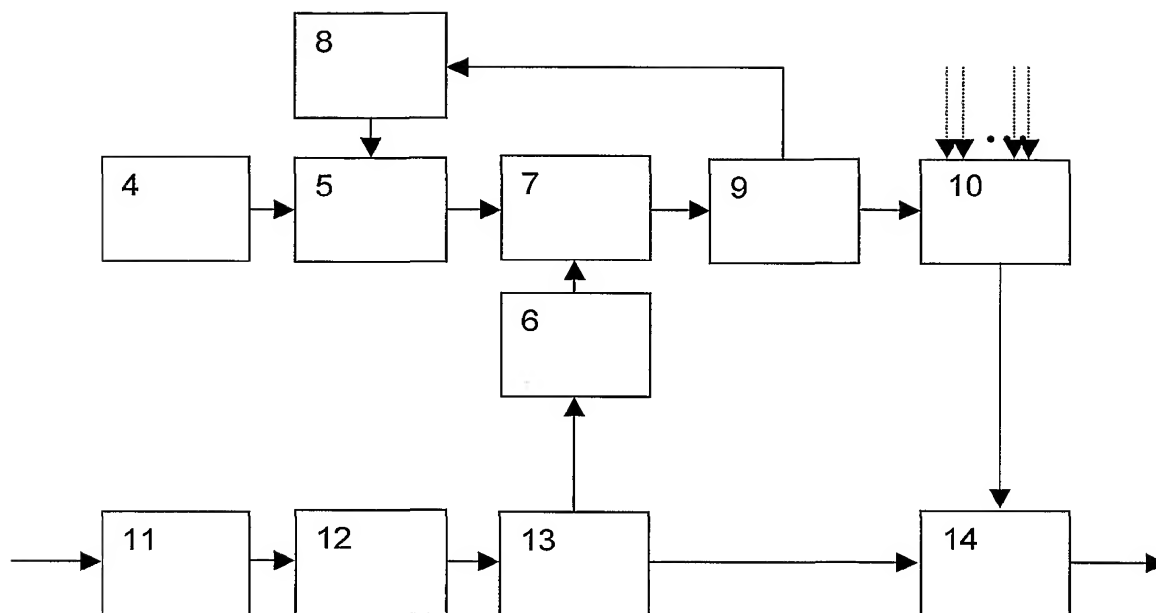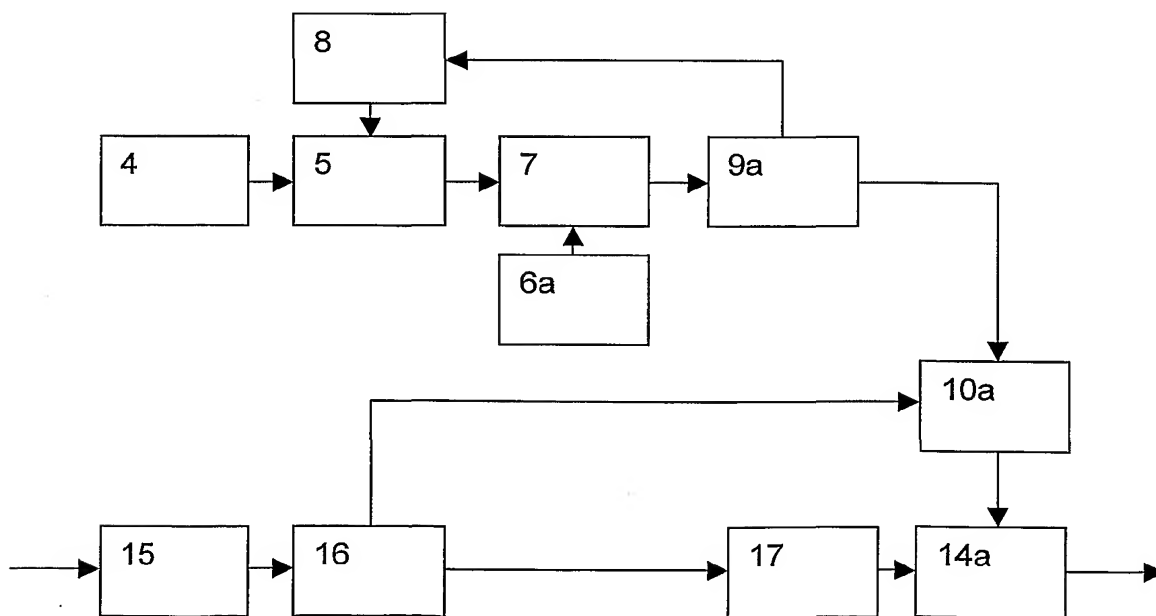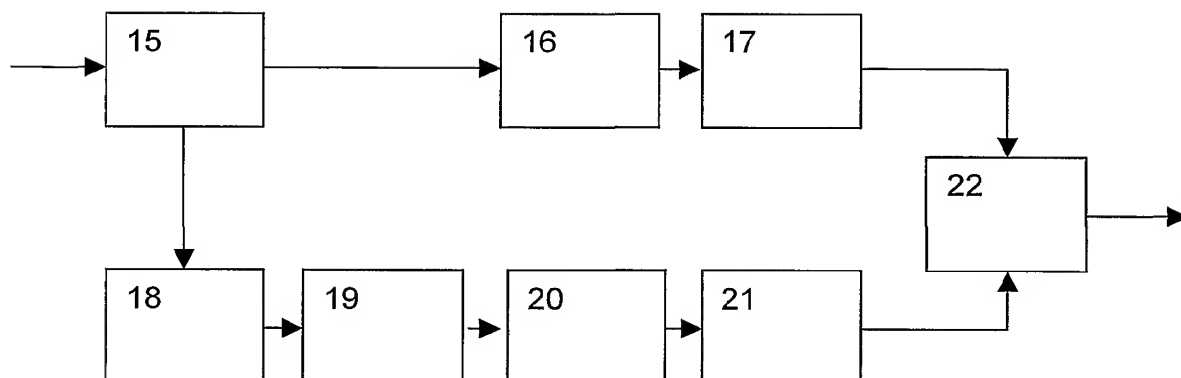
Fig. 2

Fig. 3

Fig. 4

Fig. 5

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7   H04N7/24   H04N7/173   G06F17/30

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7   H04N   G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	DAKSS J ET AL: "HYPERLINKED VIDEO" PROCEEDINGS OF THE SPIE, SPIE, BELLINGHAM, VA, US, vol. 3528, November 1999 (1999-11), pages 2-10, XP000986761 the whole document	1,2,9-11
Y		3-8
X	WO 98 47084 A (SHARP KK) 22 October 1998 (1998-10-22) page 5, line 7 –page 7, line 2; figure 2	1,2,9-11
Y	the whole document	3-8

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[X] Further documents are listed in the continuation of box C.   [X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 May 2002	24/05/2002

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Luckett, P

Form PCT/ISA/210 (second sheet) (July 1992)

page 1 of 2

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
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